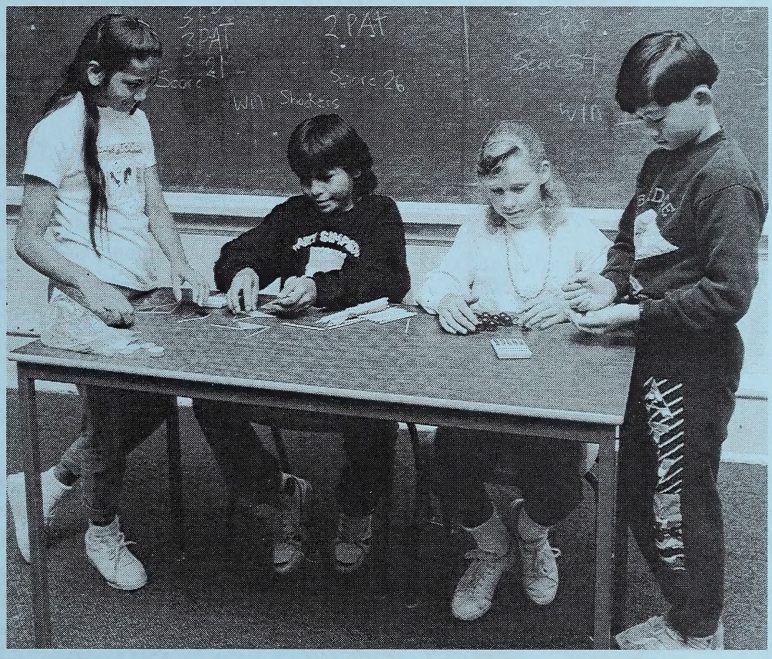
Assessment Highlights

Grade 6 Mathematics



June 1995

Students First!
Student Evaluation

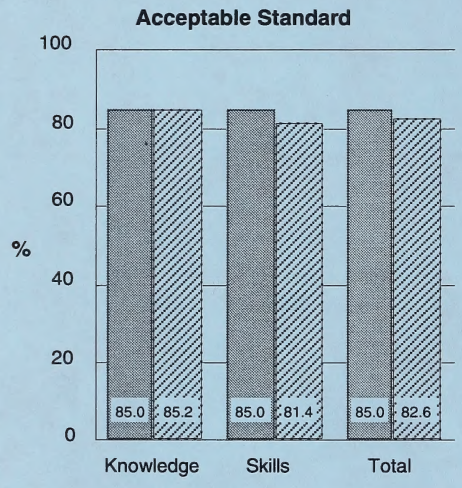
Alberta
EDUCATION

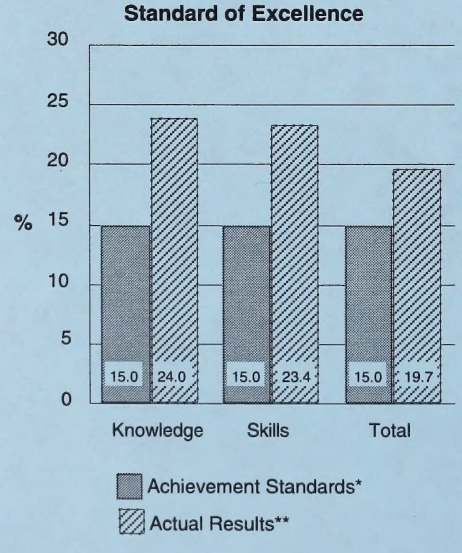
Assessment Highlights

Grade 6 Mathematics

This report provides teachers, school administrators, and the public with an overview of the results for the June 1995 Grade 6 Mathematics provincial assessment. It complements the detailed school and jurisdiction reports.

Percentage of Students Meeting:





*the percentage of students in the province expected to meet the acceptable standard and the standard of excellence

**the percentage of students in the province who met the standards (based on those who wrote)

Who Wrote the Test?

All students registered in Grade 6 were expected to write the 1995 Mathematics Achievement Test. A total of 40 493 students completed the June 1995 test. This number reflects an increase of more than 8 500 students over the last administration of the test in 1991. In 1995, only a small proportion of students in Grade 6 did not write the test: 1.8% were absent and 1.7% were excused from writing by their superintendent.

What Was the Test Like?

The assessment instrument had 50 multiple-choice questions in five content areas: Numeration, Operations and Properties, Measurement, Geometry, and Graphing. The questions were classified in two reporting categories: Knowledge and Skills. Students recorded their responses to questions on a separate answer sheet.

How Well Did Students Do?

As shown by the graphs, the number of students meeting the acceptable standard was slightly lower than expected while the number of students meeting the standard of excellence was higher than expected. This is especially impressive given that a higher proportion of Grade 6 students than ever wrote the test.

In 11.0% of the schools, the percentage of students meeting the acceptable standard was significantly above expectations for the province. In 67.5% of the schools, the percentage of students meeting the acceptable standard was not significantly different from provincial expectations. In 21.5% of schools the percentage of students meeting the acceptable standard was significantly below provincial expectations. Schools where fewer than five students wrote the Grade 6 test are not included in the calculations.

The results presented in this report are based on scores achieved by all students except those in Francophone programs. Results for Francophone students will be reported separately. Detailed provincial assessment results are provided in school and jurisdiction reports.

Has Achievement Changed Since 1991?

A study of changes in achievement was conducted as part of the provincial assessment. Results indicate that mathematics achievement in 1995 is similar to 1991.

Test Blueprint

Each question on the blueprint is classified according to its content area and reporting category. The blueprint shows the distribution of questions according to these classifications.

Strand	Knowledge	Skills	Total Number of Questions
Numeration	18, 20, 21, 26, 46	2, 12, 22, 24, 32, 38, 39, 41	13
Operations and Properties	3, 31, 43	1, 4, 5, 8, 9, 10, 23, 27, 33, 34, 47	14
Measurement	11, 29	17, 30, 42, 44, 45	7
Geometry	13, 16, 37	6, 7, 19, 25, 28, 40	9
Graphing	14, 35	15, 36, 48, 49, 50	7
Total Number of Questions	15	35	50

Test Review

The Grade 6 teachers who reviewed and set standards for the assessment felt that it was a good reflection of what students are expected to know and be able to do in mathematics by the end of Grade 6. They felt that the test emphases on understanding concepts and applying them in context, using meaningful situations, and interpreting concrete, pictorial, and symbolic modes to demonstrate understanding were appropriate. They also felt that the assessment had a good range of question types and difficulties.

Observations and Sample Questions

Sample questions from the test and accompanying discussion are provided to highlight the strengths and weaknesses of students meeting the acceptable standard and the standard of excellence. For each sample question, there is an asterisk beside the correct answer.

Use the following information to answer question 2.

Four students had luggage with these masses:	
Dana 9.7 kg	Roger 9.65 kg
Chandra 9.08 kg	Michael 9.2 kg

2. Which student had the luggage with the greatest mass?

***A.** Dana
B. Roger
C. Chandra
D. Michael

Use the following information to answer question 8.

When the bus left Prairieview School,
the odometer read:

1	6	0	0	7

At the lunch stop, the odometer read:

1	6	2	1	9

Jasper is 97 km from the lunch stop.

8. When the bus arrived at Jasper, what did the odometer read?

A. 16 104
***B.** 16 316
C. 16 406
D. 16 528

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9. Ryan's chocolate bar wrapper said that he could win a prize if he answered the following "skill-testing question."

$$\begin{aligned} & ? \\ \times\ & 13 \\ \times\ & 10 \\ \div\ & 4 \\ \div\ & 5 \\ = & 923 \end{aligned}$$

What is the value of the question mark?

A. 130
***B.** 142
C. 2600
D. 5999.5

Acceptable Standard

Question 2 required students to order decimal numbers. Only about 60% the students meeting the *acceptable standard* but not the standard of excellence were able to answer this question correctly.

Question 8 required students to determine the operation needed to solve the problem and compute the answer. Students meeting the *acceptable standard* were very successful with this question.

Question 9 required students to apply the strategy of working backwards to solve a computation problem. About 75% of students meeting the *acceptable standard* were able to do this.

Question 24 required students to represent a written fraction pictorially. About 85% of students meeting the *acceptable standard* answered this question correctly.

Overall, results show that students who met the *acceptable standard* were able to solve one-step problems. Specifically, students meeting the acceptable standard could

- determine the operation needed to solve a straightforward problem and carry out the computation (question 8)
- estimate sums and products
- interpret simple charts and graphs
- translate numbers from one form to another (question 24)
- relate a net to the corresponding 3-D object
- recognize a reflection
- apply basic measurement skills to real-life situations

24. Two-fifths of the class voted to hike to Wolverine Canyon first. This fraction could be represented as

A.

B.

C.

* D.

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22. Terry forgot the Prairieview bus number. These are some facts about the bus number that Terry remembered:

- it has three digits
- the digit in the ones place is greater than one
- the digit in the hundreds place is two times the ones place
- there is a zero in the number

What could the bus number be?

A. 204
B. 240
* C. 402
D. 420

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26. Sandy and Bill kept a record of temperatures during their stay. Which group of temperatures is arranged from **lowest** to **highest**?

A. –2, –6, 0, 1, 2
* B. –6, –2, 0, 1, 2
C. 0, 1, 2, –2, –6
D. –2, 0, 1, 2, –6

They had difficulty

- solving multistep problems
- ordering fractions and decimal numbers (question 2)
- determining the perimeter of a polygon
- converting measurements from one unit to another

Standard of Excellence

The following commentary highlights the skills and knowledge of students who met the *standard of excellence.*

Question 22 required students to apply place-value concepts. Students meeting the *standard of excellence* can do this.

Question 26 required students to order integers. Over 90% of students meeting the *standard of excellence* can do this.

Students who meet the standard of excellence were more successful in solving multistep and novel problems than other students. Specifically, students meeting this standard could

- order integers (question 26)
- apply operations in solving problems
- apply place value concepts (question 22)
- identify a pattern to solve a problem
- interpret, analyze, and accurately apply information from charts and graphs
- determine the reasonableness of measurements

Comments

Double Keyed Question

Question 5 on the 1995 Mathematics Achievement Test was double keyed because two alternatives were deemed to be equally correct.

Resolving Administration Anomalies

Although we announced the new practice of reusing items from 1992, 1993, or 1994 tests, and the securing of these tests as late as October 1994, most schools were able to respond quickly and were successful in avoiding the use of these tests with students. Consequently, the 1995 testing was conducted effectively throughout Alberta without compromising the validity of the results. In a few schools, however, questions were raised about students' prior access to the test items and concerns were rightfully expressed about fairness and accuracy. Superintendents were asked to investigate, along with school principals and teachers, these and all other non-standard testing practices brought to our attention and to make recommendations about the validity of the results. Initially 173 student results for Grade 6 mathematics were reported as "not available," pending further investigation due to validity concerns. In the end, results for only 2 students were determined to be invalid for Grade 6 mathematics.

Release of Secured Items

As outlined in the General Information Bulletin, items from the achievement tests are secured except those that are released each year in the subject area bulletins. The items in these bulletins may be used to prepare students for the provincial assessment. The subject area bulletins are mailed to all schools in the fall.

Parent Guide to Provincial Achievement Testing

Last spring, we sent to schools copies of the *Parent Guide to Provincial Achievement Testing* to distribute to parents through the students in grades 3, 6, and 9. The purpose was to support open communication about provincial standards and the testing program among the teacher, the student, and the parent. The guide included a tear-out card with several questions and space for comments. Parents returned over 2000 cards; about half included comments. Parents' feedback about the learnings expected of students, the quality of questions on the tests, and the testing program was generally positive. Their written comments ranged from positive to negative, and many simply asked for more information. As parents seemed to appreciate this form of communication, we are looking for a way to make the guide available again later this school year.

Performance-Based Assessment

In addition to writing the achievement tests, a random sample of students from across the province participated in performance-based assessments in **Language Arts 3, Mathematics 6,** and **Social Studies 9** in 1995.

Performance-based assessment reports will be sent to participating schools. A *"Samples of Student Responses"* document for the performance-based assessment will be prepared and made available to all schools in the spring of 1996.

1995 Administration—A Note of Thanks

We at Student Evaluation wish to express our appreciation to you, the principals and teachers throughout Alberta, for the care and attention you gave to the administration of the 1995 Achievement Tests. Successful implementation of the expanded program and the changes in procedures and rules depended on your assistance and cooperation. We hope that you find the changes in the testing and the additional achievement information helpful in your work with students.

For further information, contact Kathleen Melville, Assessment Specialist, or Dennis Belyk, Assistant Director, at 403-427-0010. The toll-free number is 310-0000.

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